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(54) Abstract Title
Vehicles or machines : cabs : guiding openable cab window

(57) A window 16 of a vehicle or machine cab is manually movable between window opening 14 and a position under roof 34, through intermediate position I. The frame has pairs of upper and lower guide members at its sides which are guided in tracks running up the window pillars and along the roof. The frame is also guided by a slotted link pivoting about an upper end on the cab (and shown in three positions), a pin on the frame reciprocally sliding in the link slot as the frame moves. The frame is moved by handles 25 which also control frame locking. A gas spring may assist frame movement.

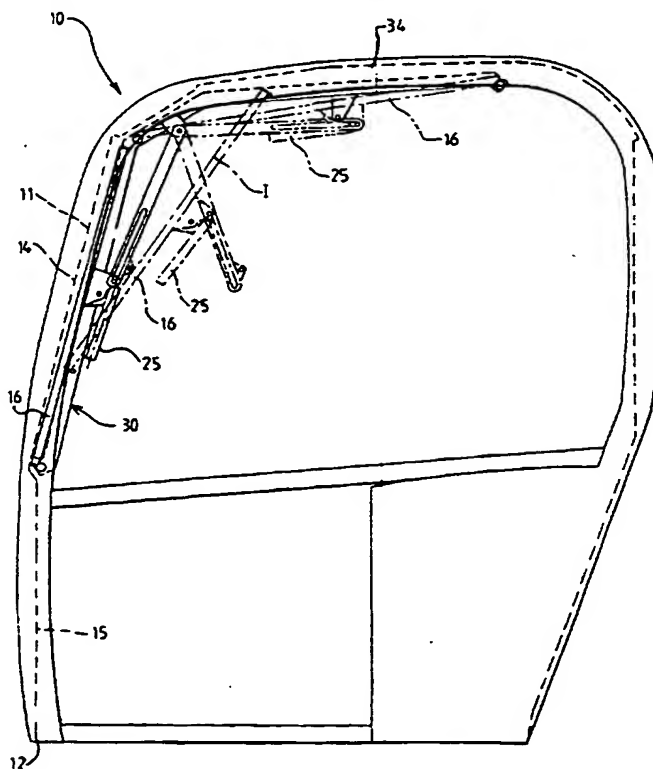


FIG 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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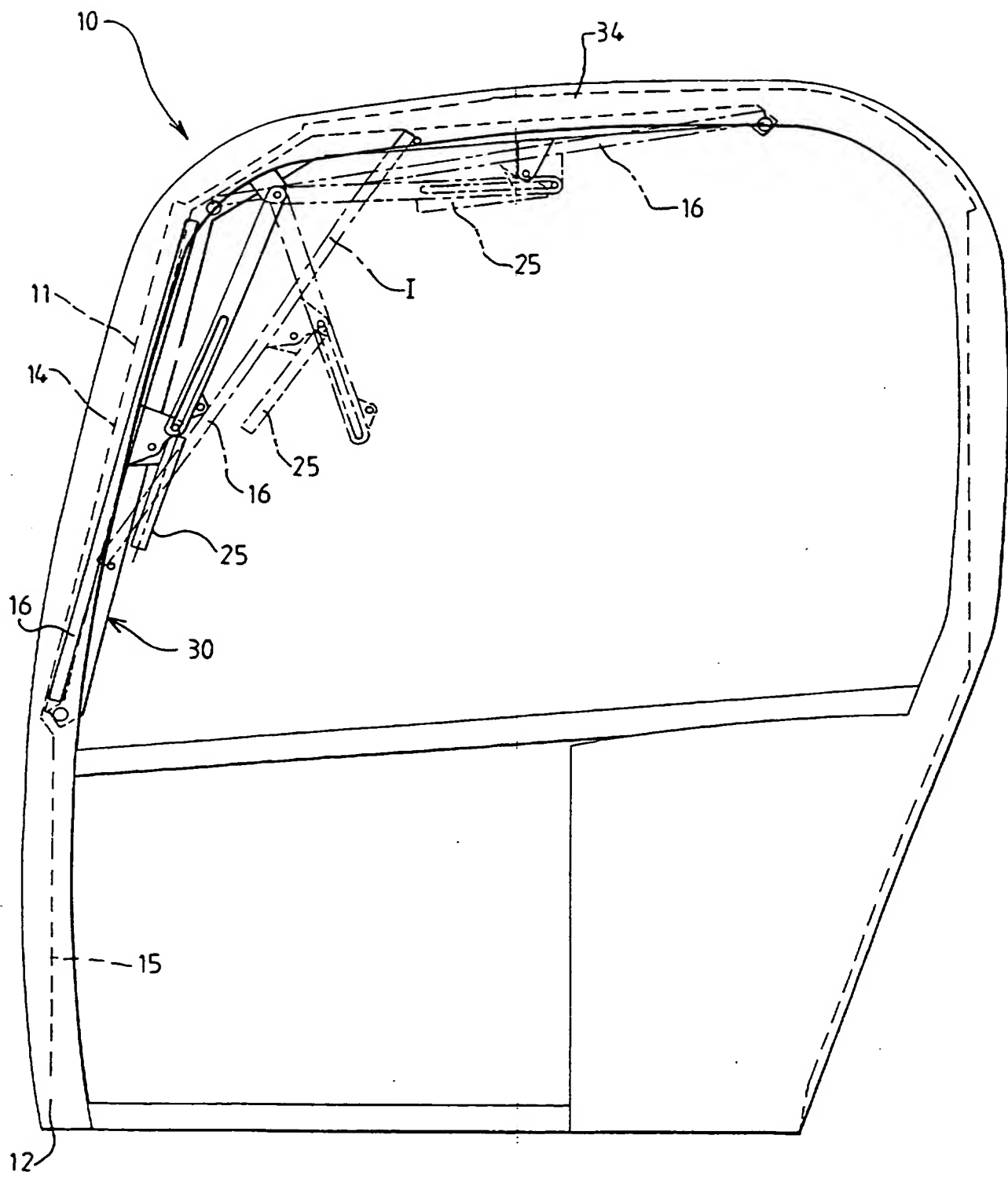


FIG 1

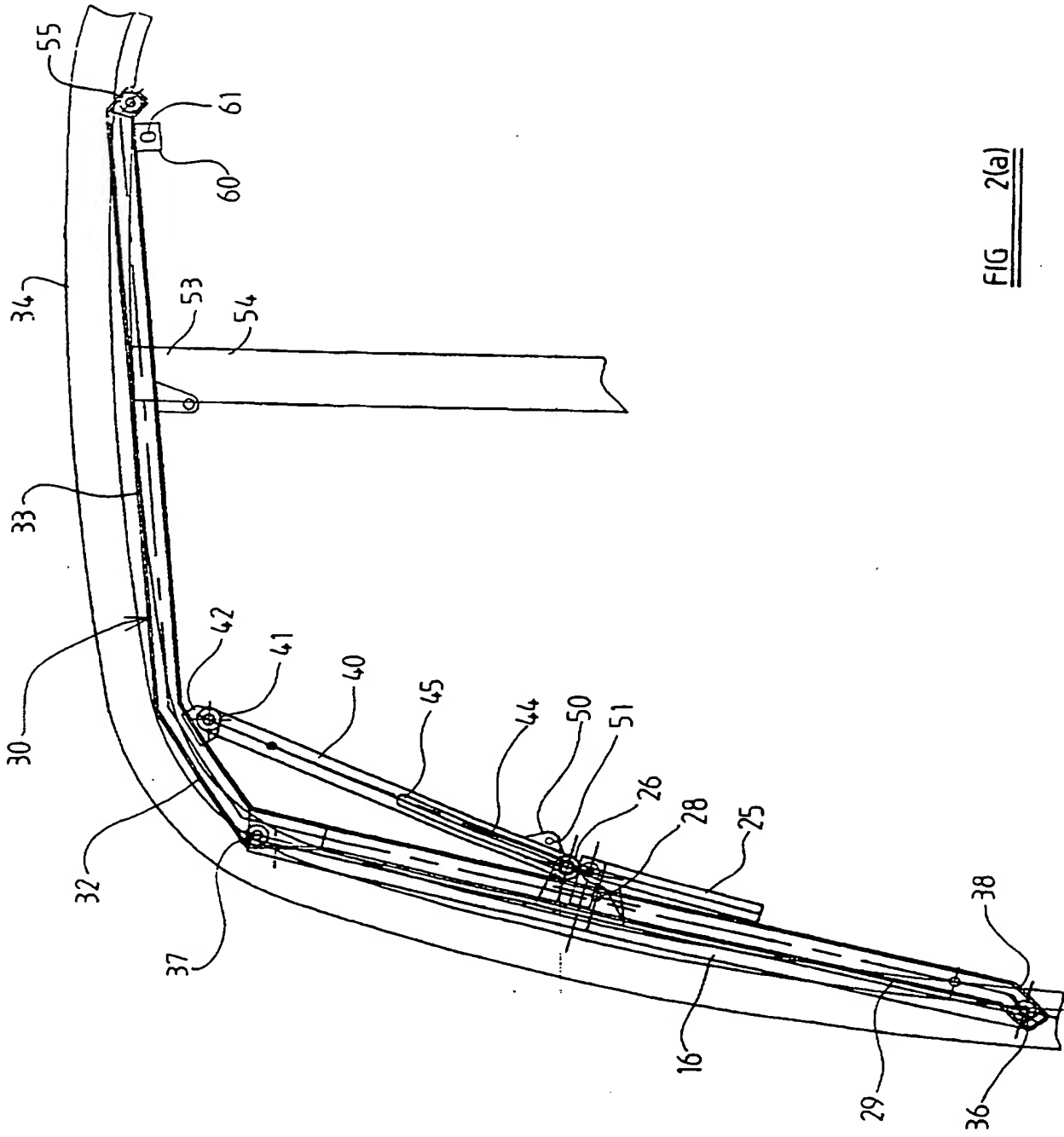


FIG 2(a)

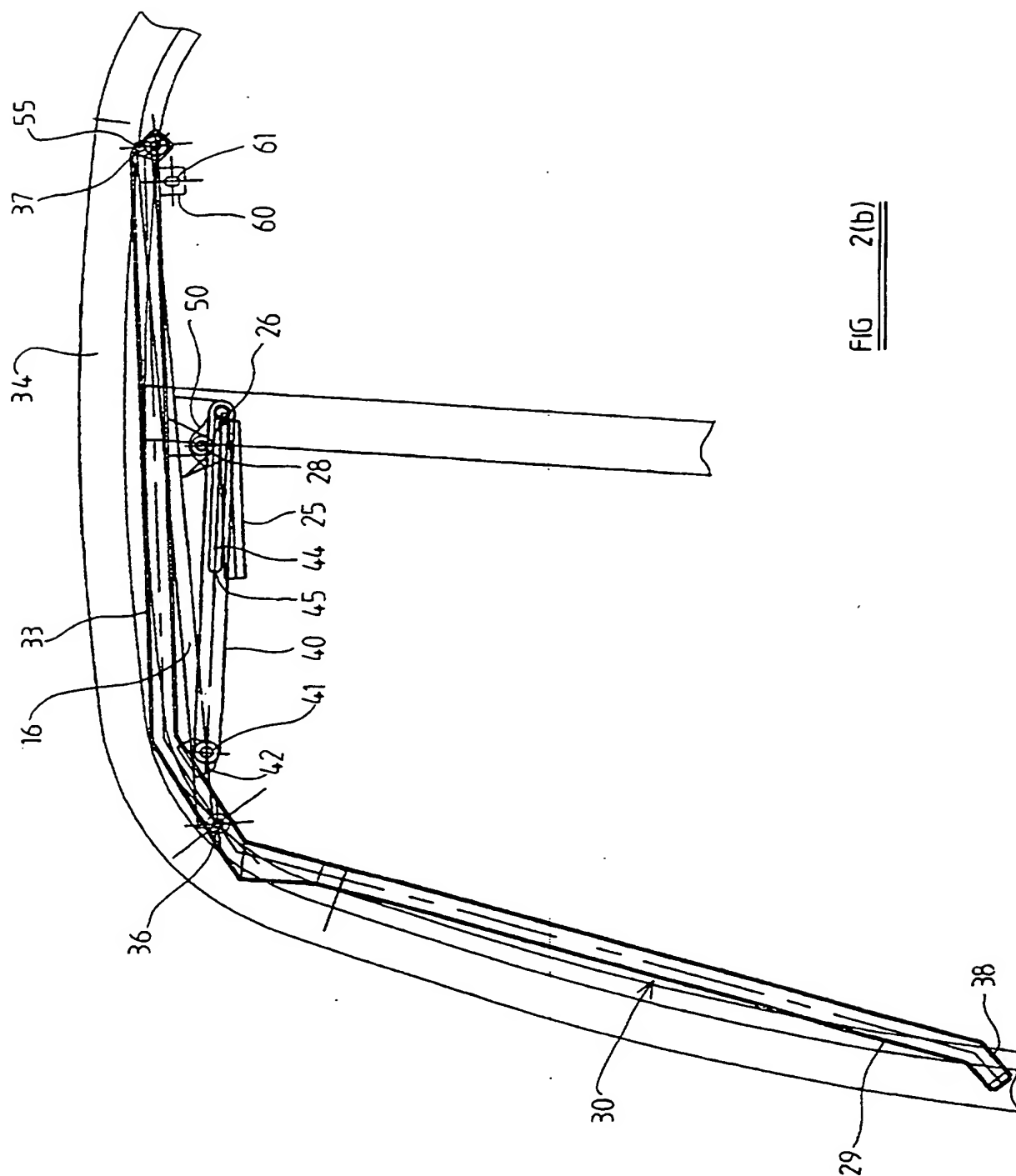


FIG 2(b)



FIG 3

PATENTS ACT 1977

DJL/A9716GB

Title: Improvements in or Relating to Window Assemblies for Cabs

Description of Invention

This invention relates to a window assembly for a cab of a vehicle or machine, and more particularly but not exclusively to such a window assembly for a cab of a machine such as a so called mini-excavator.

Mini-excavators, because of their small size tend to have cabs with restricted space therein. A front wall of the cab of such a machine typically has a window having a first lower fixed panel, and an upper openable panel. The openable panel typically is movable between a closed position in which a window opening of the wall is closed, and an open position in which the window panel is stowed within the cab, e.g. along a roof of the cab.

Presently a window assembly is known which includes an opening casement having an upper edge, a lower edge and first and second side edges, the casement being moveable in a frame from a closed position in which the casement closes a window opening and an open position, the frame including a pair of tracks in which respective guide members mounted on the casement ride as the casement is moved between the open and closed positions, and there being a pair of guide links pivotally mounted with respect to the frame, the links being connected to the casement and being operative to guide the casement as the casement moves in the frame between the open and closed positions.

The guide members are provided at the side edges of the casement towards the lower edge and the tracks are substantially straight, extending up substantially straight pillars of the cab, and as the window is opened, the upper edge of the casement is guided solely by the links.

Such previous arrangement is suitable for some cab configurations, but particularly where for example the cab pillars are curved and the tracks

follow the pillars, the upper edge of the casement, as the window is opened moves too far towards the operator for comfort, a particularly problem for tall operators. Also, where the pillars are curved, when the window is in its open stowed position, a substantial space is wasted between the roof of the cab and the window.

Another problem with conventional window assemblies, particularly one in which the tracks follow the curved pillars, and the casement is guided by a single pair of guide members located towards the lower edge of the casement, is that the window is unstable as it is opened and the guide members tend to bind unless the operator ensures that both side edges of the window are moved synchronously.

According to a first aspect of the invention we provide a window assembly for a cab of a vehicle or machine, the assembly including an opening casement having an upper edge, a lower edge and first and second side edges, the casement being moveable in a frame from a closed position in which the casement closes a window opening and an open position, the frame including a pair of tracks in which respective guide members mounted on the casement, ride as the casement is moved between the open and closed positions, and there being at least one guide link pivotally mounted with respect to the frame, the link being connected to the casement and being operative to guide the casement as the casement moves in the frame between the open and closed positions, characterised in that the casement has a first pair of guide members mounted along the first and second side edges towards the lower edge of the casement, and a second pair of guide members mounted along the first and second edges towards the upper edge of the casement, and the connection between the casement and the link includes a connecting member mounted on the casement which is held captive by the link and is guided to move longitudinally along the link and to permit of pivotal relative movement between the link and the casement as the guide members move along other parts of the tracks.

Using such an arrangement it is possible for the tracks to extend substantially further than in the previously known arrangements such that the casement may be supported towards both the upper and lower edges by the first and second pairs of guide members, as movement of the connecting member along the guide link prevents the guide link inhibiting casement movement. Moreover the tracks may extend close to the cab roof so that the casement when in an open position extends close to the cab roof thereby avoiding space wastage.

Preferably when the casement is in its closed position, the casement extends generally upright, and when in the open position the casement is substantially inclined to the vertical, e.g. the casement extends along a roof of the cab.

Thus each of the tracks may have a first generally upright part, and at least one further part which is inclined to the first part and may extend along a roof of the cab.

Even though pillars of the cab along which the tracks extend may be curved, preferably the first generally upright part of each of the tracks is substantially straight. The tracks may extend up the wall and along the roof whereby the casement when in the open position, lies closely adjacent to the roof.

The window assembly is primarily intended to be manually operable in which case the casement has along each of the first and second side edges, manual operating means by means of which the casement may be moved between its open and closed positions. For example, the manual operating means may include a handle mounted on a handle mount, and the connecting member which moves along the link may also be mounted on the handle mount.

In a preferred arrangement the connecting member of the casement includes a pin, the pin being held captive in a guide channel of the guide link, such as a slot of the guide link.

The casement and the frame may have co-operating locking means positively to retain the casement in its open position. For example the casement may carry a retractable locking pin which is received in a corresponding opening of the frame or the guide link when the casement is in its open position, or preferably, the casement has a pair of such locking pins, one carried along each of the first and second side edges of the casement.

In each case preferably the locking means is manually releasable.

According to a second aspect of the invention we provide a cab for a vehicle or machine having a window assembly according to the first aspect of the present invention.

The cab may include a superstructure including a pair of pillars, one either side of a window opening, and a roof, the pillars each having provided thereon a part of a track of the window assembly, and a further part of each track extending adjacent to the roof.

The pillars may be of curved configuration, but the track parts which extend therealong may be substantially straight.

The invention will now be described with reference to the accompanying drawings in which:-

FIGURE 1 is an illustrative side view of a cab of a machine, having a window assembly according to the invention shown in three alternative positions;

FIGURE 2 is a more detailed illustrative side view of the window assembly of figure 1; (a) closed and (b) open;

FIGURE 3 is an illustrative plan view of the window assembly of figures 1 and 2 with a casement thereof in an open position.

Referring to the drawings, a cab 10 for a machine being in this example a so called mini-excavator, comprises a window frame 11 secured to or integral with a pair of generally curved but upright pillars 12a, 12b of the cab 10 superstructure. The pillars 12a, 12b define between them, a window opening

14. A lower region of the window opening 14 is closed by a fixed glazing pane 15, whereas an upper region of the opening 14 has mounted therein an openable window casement 16 which has an upper edge 18, a lower edge 19, and first and second side edges 20a, 20b, edges 18, 19, 20a and 20b including casement boundary members which retain between them a glazing panel 21.

The casement 16 further carries at approximately the mid points along each of the side edges 20a, 20b, a handle mount 23, 24, which respectively each mounts a manually engageable handle 25, and a connecting member which comprises a pin 26. The handle mounts 23, 24 also each mount a sprung locking pin 28a, 28b which operates as hereinafter described.

The frame 11 includes along each of the curved pillars 12a, 12b, a generally upright and straight part 29 of a track 30. Thus even though the pillars 12a, 12b are curved, the track parts 29 which extend therealong, are straight.

The tracks 30 further comprise second track parts 32 which extend at about 45° to the straight track parts 29, and third track parts 33 which extend along the underside of a roof 34 of the cab 10. The tracks 30 are continuous so that guide members of the casement 16 can move along the three track parts 29, 32, and 33.

The casement 16 has mounted on the side edges 20a, 20b thereof a first pair of guide members 36 which are located towards the lower edge 19 of the casement 16 and project outwardly of the side edges 20a, 20b into the tracks 30, and a second pair of guide members 37 which are located towards the upper edge 18 of the casement 16, and again project outwardly into the tracks 30. The guide members 36, 37 may comprise simple spigots, but preferably comprise rollers so that the guide members 36, 37 may freely move along the tracks 30.

When the casement 16 is in its closed position, as indicated in figure 2 in dotted lines, the upper and lower guide members 37, 36 are located in the straight generally upright parts 29 of the tracks 30. It can be seen that the straight generally upright parts 29 of the tracks 30 include at the lower ends

thereof, a dog-leg track section 38 in which the lower guide members 36 are located to assist in maintaining the casement 16 in the closed position until it is desired to open the window. In addition the spring locking pins 28 engage in parts 29 of the tracks 30 to secure the casement 16 closed.

As the casement 16 is manually moved towards the open position indicated in dotted lines in figure 2, by an operator within the cab 10 grasping the handles 25, the upper guide members 37 enter the second track parts 32, and then the third track parts 33. By virtue of the provision of two pairs of guide members 36, 37, one pair 36 being located towards the lower edge 19 of the casement 16 and the other pair 37 being located towards the upper edge 18 of the casement 16, the casement 16 is positively guided during such movement such that there is less risk of the guide members 36,37 binding, as can occur where only a single pair of guide members is provided.

Further to guide the casement 16 along a desired path during opening of the window, there is provided a single guide link 40 at one side of the cab 10, preferably remote from a cab door opening so that the link 40 does not obstruct the door opening. The link 40 is pivoted at one end 41 relative to the cab frame 11, the track 30 at the one side of the cab 10 having a mounting 42 to which the one end 41 of the link 40 is pivoted. At an opposite end of the link 40 there is provided a guide track in the form of a slot 44 which extends along the link 40, the slot 44 receiving the connecting pin 26 and holding the pin 26 captive.

During initial movement of the casement 16 from its closed position, the connecting pin 26 may move along the slot 44 as the link 40 pivots. When the connecting pin 26 reaches an extreme inner end 45 of the slot 44, further movement of the casement 16 towards its open position will pivot the link 40 about the pivoted end 41 towards an upper position shown in figure 2 (b), the link 40 guiding the casement 16 along the desired path of movement.

The casement 16 is indicated in a position in figure 1 at I intermediate (single chain lines) its open (double chain lines) and closed (dashed lines) positions.

The link 40 carries adjacent the slotted 44 end thereof, a protuberance 50 with an opening 51 therein. As the link 40 reaches its uppermost position when the casement 16 is in its open position, the opening 51 in the protuberance will be aligned with the sprung locking pin 28a carried by the handle mount 23. The locking pin 28a and the protuberance 50 are shaped so that as the casement 16 reaches its open position, the locking pin 28 engages the protuberance 50 and is depressed against its spring, but the spring urges the locking pin 28a outwardly so that the pin eventually is received in the opening 51 of the protuberance 50. Thus the casement 16 is positively held in its open position by the engagement of the locking pin 28a in the opening 51.

At the other side of the casement 16 where no pivoted link 40 is provided, the sprung locking pin 28b mounted by the handle mount 24, co-operates with a formation 53 mounted on the frame 11, which formation 53 has an opening 54 for the locking pin 28b. Thus the casement 16 is positively held at either side thereof when in the open position.

When it is desired to close the window again, the sprung locking pins 28a, 28b must be released from their respective openings 51, 54 which can be achieved by the operator as the operator grasps the handles 25.

It is possible to provide a single guide link 40 only by virtue of the provision of two pairs of guide members 36, 37 although if desired, a guide link 40 could be provided at each side of the casement 16.

Further features of the invention are as follows.

To facilitate moving the casement 16, one or a pair of gas struts 64 are provided as is well known in the art. Preferably a single gas strut 64 is provided at a side of the cab 10 remote from the door opening, so that the gas strut does not obstruct the door opening.

It can be seen that the third track parts 33 which extend generally along the roof 34 each terminate in a dog-leg extension 55 into which the upper guide members 37 locate when the casement 16 is in its open position to provide further support for the casement 16 when in the open position.

The frame 11 including the tracks 30 may be secured to the cab 10 superstructure by fastenings, and adjacent the dog-leg extensions 55, the tracks 30 may have formations 60 with openings 61 for fasteners to facilitate fixing of the tracks 30 at their ends, to the cab superstructure e.g. the cab roof 34.

The embodiment described above comprises tracks 30 having a number of straight portions 29,32,33, however the portions may be curved in alternative embodiments.

The features disclosed in the foregoing description, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or compositions, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A window assembly for a cab of a vehicle or machine, the assembly including an opening casement having an upper edge, a lower edge and first and second side edges, the casement being moveable in a frame from a closed position in which the casement closes a window opening and an open position, the frame including a pair of tracks in which respective guide members mounted on the casement, ride as the casement is moved between the open and closed positions, and there being at least one guide link pivotally mounted with respect to the frame, the link being connected to the casement and being operative to guide the casement as the casement moves in the frame between the open and closed positions, characterised in that the casement has a first pair of guide members mounted along the first and second side edges towards the lower edge of the casement, and a second pair of guide members mounted along the first and second edges towards the upper edge of the casement and the connection between the casement and the link includes a connecting member mounted on the casement which is held captive by the link and is guided to move longitudinally along the link and to permit of pivotal relative movement between the link and the casement as the guide members move along the tracks.
2. An assembly according to claim 1 characterised in that when the casement is in its closed position, the casement extends generally upright, and when in the open position the casement is substantially inclined to the vertical.
3. An assembly according to claim 2 characterised in that when in the open position, the casement extends generally along a roof of the cab.

4. An assembly according to any one of the preceding claims characterised in that each of the tracks has a first generally upright part, and at least one further part which is inclined to the first part.
5. An assembly according to claim 4 characterised in that the first generally upright part of each of the tracks is substantially straight.
6. An assembly according to claim 4 or claim 5 which is for use in a cab having a window opening, and a roof, the tracks extending up pillars of the cab superstructure and along the roof whereby the casement when in the open position, lies adjacent to the roof.
7. An assembly according to any one of the preceding claims characterised in that the casement has along each of the first and second side edges, manual operating means by means of which the casement may be moved between its open and closed positions.
8. An assembly according to claim 7 characterised in that the manual operating means includes a handle mounted on a handle mount, the connecting member which moves along the link also being mounted on the handle mount.
9. An assembly according to any one of the preceding claims characterised in that the connecting members includes a pin, the pin being held captive in a guide channel of the link.
10. An assembly according to any one of the preceding claims characterised in that the casement and the frame have co-operating locking means positively to retain the casement in its open position.

11. An assembly according to claim 10 characterised in that the casement carries a retractable locking pin which is received in a corresponding opening of the frame or the guide link when the casement is in its open position.
12. An assembly according to claim 11 characterised in that the casement has a pair of such locking pins, one carried along each of the first and second side edges.
13. An assembly according to any one of claims 10 to 12 characterised in that the locking means is manually releasable.
14. A window assembly substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
15. A cab for a vehicle or machine having a window assembly according to any one of the preceding claims.
16. A cab according to claim 15 characterised in that the cab includes a superstructure including a pair of pillars, one either side of a window opening, and a roof, the pillars each having provided thereon a part of a track of the window assembly, and a further part of each track extending adjacent to the roof.
17. A cab according to claim 16 characterised in that the pillars are each of curved configuration, but the track parts which extend therealong are substantially straight.

18. A cab substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

19. An novel feature or novel combination of features described herein and/or as shown in the accompanying drawings.



Application No: GB 9901360.9
Claims searched: 1-18

Examiner: G WERRETT
Date of search: 16 April 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B7B, E1J, E2M.

Int Cl (Ed.6): E02F, E05D, E05F.

Other: Online : WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

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Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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